

A method is provided to automatically determine a structure cancelled image in a dual energy decomposition system. A high energy and a low energy level image of internal anatomy formed of at least first and second types of structure are acquired. A characteristic mask is computed using a gradient mask and a localization mask. A first cancellation parameter is evaluated against the characteristic mask, and a second cancellation parameter is computed based upon the first cancellation parameter. The first or second cancellation parameter is selected from a range in a look-up table determined by an effective kVp used to acquire the high level image and an effective kVp used to acquire the low level image. An image of soft structure and an image of hard structure are obtained from the first and second energy level images according to a cancellation equation using the first and second cancellation parameters.